

Movement Patterns of Tunas in a network of FADs around Oahu

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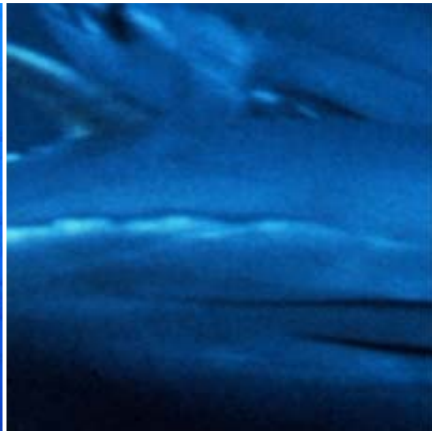
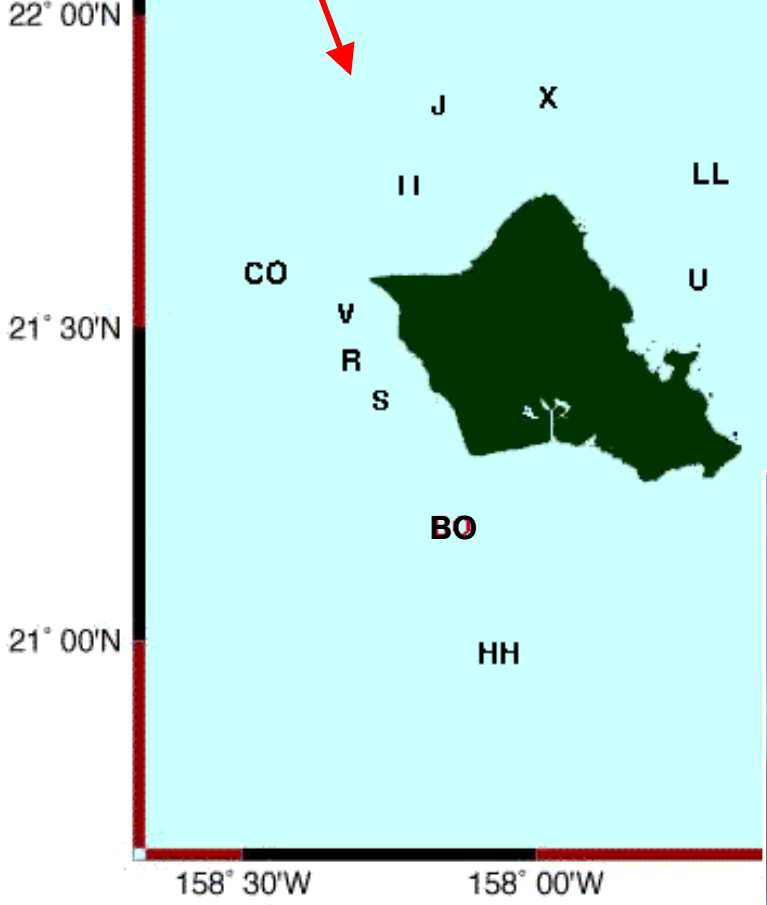
David ITANO



Oahu: 13 FADs



158° 30' W 157° 30' W



FADS	Aug 15	Sept 15	Oct 1	Oct 15	Nov 1	Nov 15	Dec 1	Dec 15	Jan 1	Jan 15	Feb 1	Feb 15
HH	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
BO	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
S	Blue	Blue	Blue	Blue	Black	Blue	Blue	Blue	Blue	Blue	Blue	Blue
R	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
V	Blue	Blue	Blue	Blue	Blue	Black	Black	Black	Black	Black	Blue	Blue
CO	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
II	Blue	Blue	Blue	Blue	Blue	Blue	Black	Black	Black	Black	Blue	Blue
J	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
X	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
LL	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
U	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
MM	Blue	Blue	Blue	Blue	Blue	Black	Black	Black	Black	Blue	Blue	Blue
T	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue

	Mar 1	Mar 15	April 1	April 15	May 1	May 15	June 1	June 15	Jul 1	Jul 15	Aug 1	Aug 15
HH	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
BO	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
S	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
R	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
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CO	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
II	Blue	Blue	Blue	Blue	Blue	Black	Black	Black	Blue	Blue	Blue	Blue
J	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
X	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
LL	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
U	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
MM	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
T	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Black	White	White

	Sept 1	Sept 15	Oct 1	Oct 15	Nov 1	Nov 15	Dec 1
HH	Blue	Blue	Blue	Blue	Blue	Blue	Black
BO	Blue	Blue	Blue	Blue	White	White	White
S	Blue	Blue	Blue	Blue	Blue	Blue	White
R	Blue	Blue	Blue	Blue	Blue	Blue	White
V	Blue	Blue	Blue	Blue	White	White	White
CO	Blue	Blue	Blue	Blue	White	Black	Black
II	Blue	Blue	Blue	Blue	White	White	White
J	Blue	Blue	Blue	Blue	White	White	White
X	Blue	Blue	White	White	White	White	White
LL	Blue	Blue	White	White	White	White	White
U	Blue	Blue	White	White	White	White	White
MM	Blue	Blue	White	White	White	White	White
T	White	White	White	White	White	White	White

48 VR2 downloads OK
 4 VR2 downloads with problems
 2 VR2 downloads partial
 11 VR2 lost (3VR2 recovered)

Tagging

71 tagged tuna

11 with Arch.

57 fish detected

(more than 2 pings)

20 recaptures (19 YFT & 1 BET)

32% rec. (YFT)

2 with Arch.

59 YFT

10 with Arch.

46 YFT

9 with Arch.

12 BET

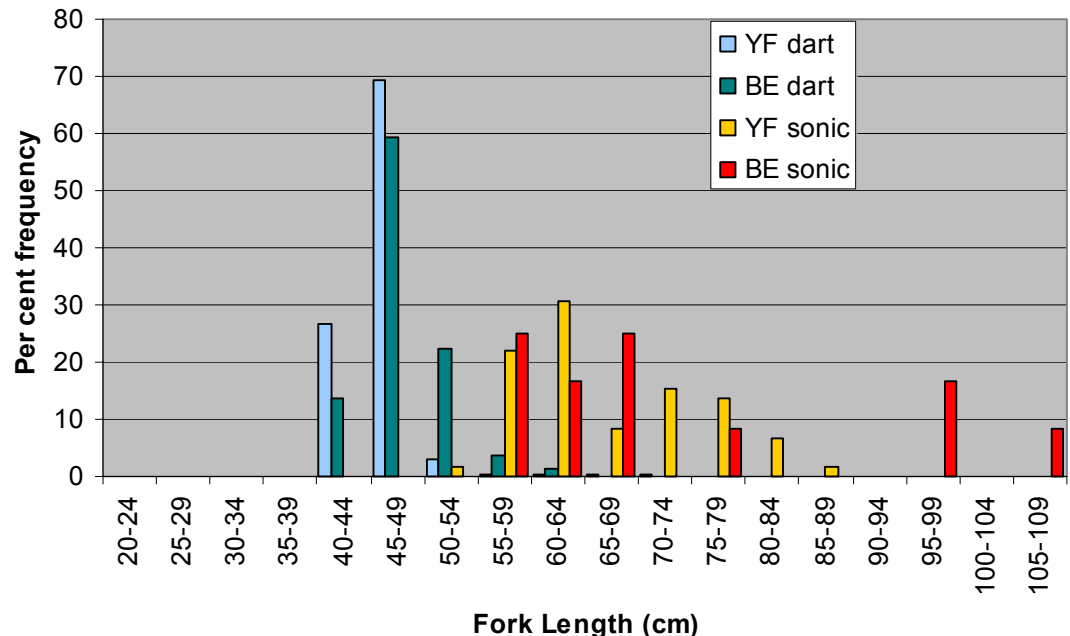
1 with Arch.

11 BET

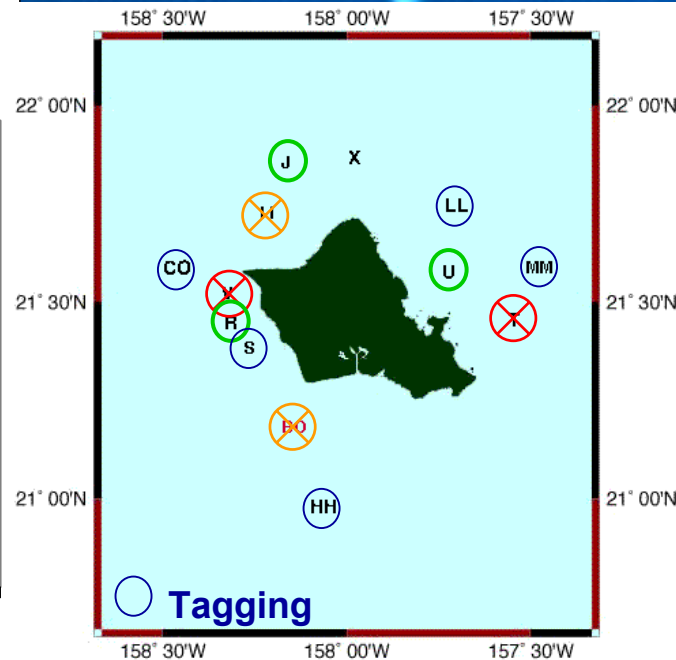
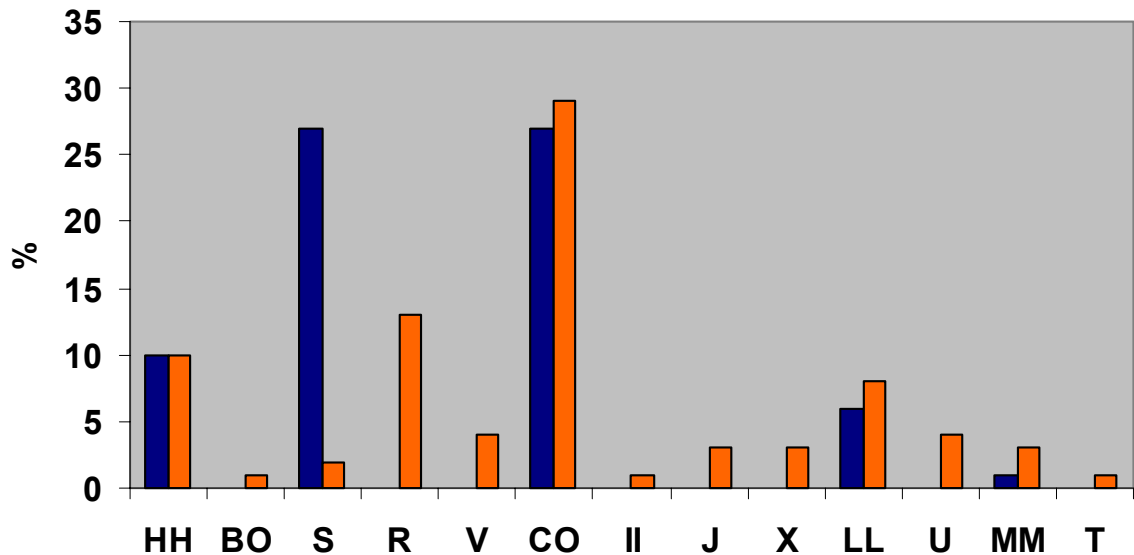
1 with Arch



Size Distribution of YFT (59) and BET (12) tagged with sonic tags
(Comparison with YFT & BET tagged with dart tags on BO)



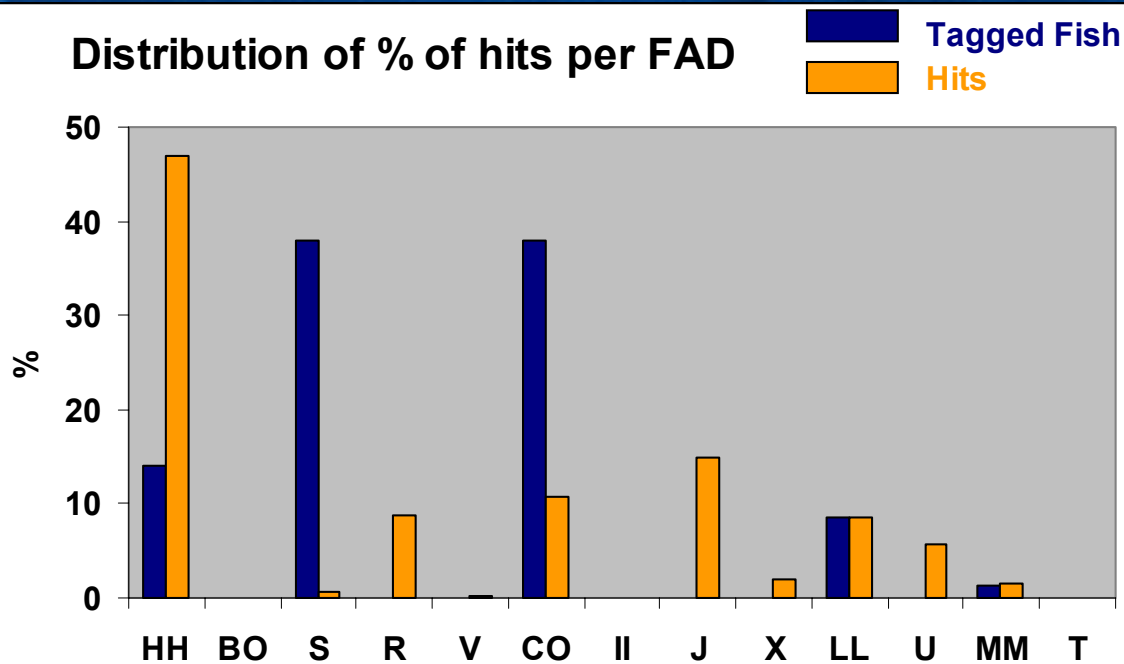
% of fish at FADs

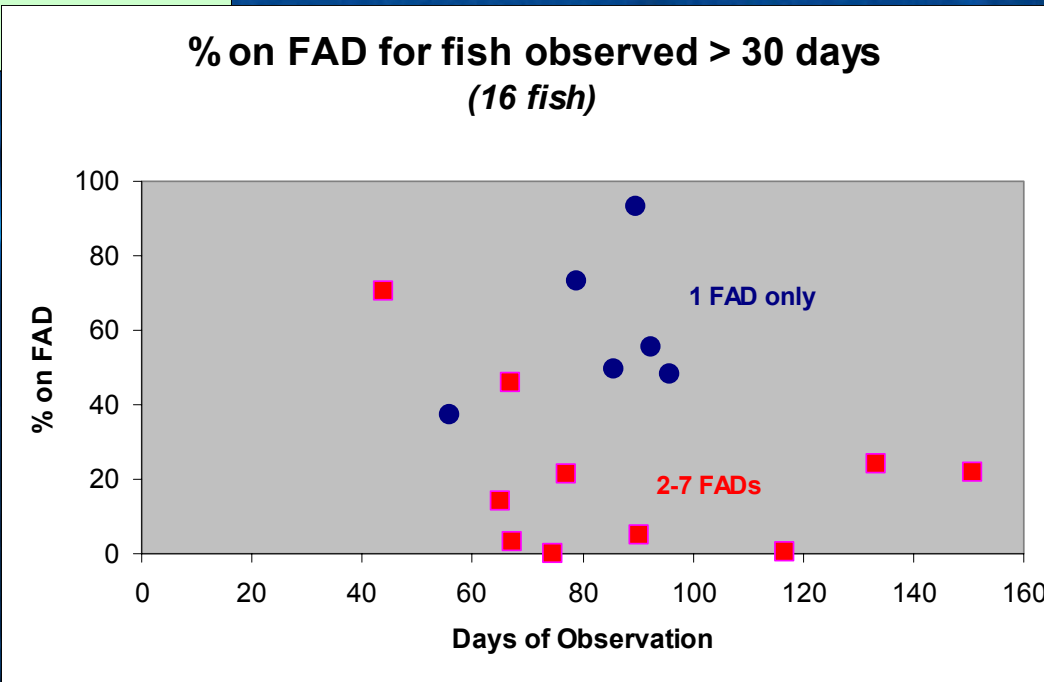
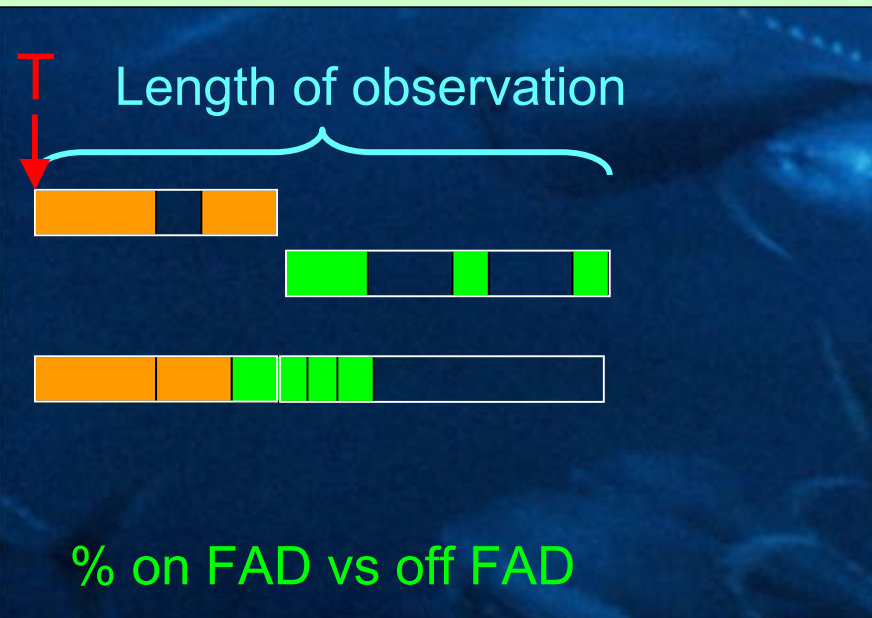
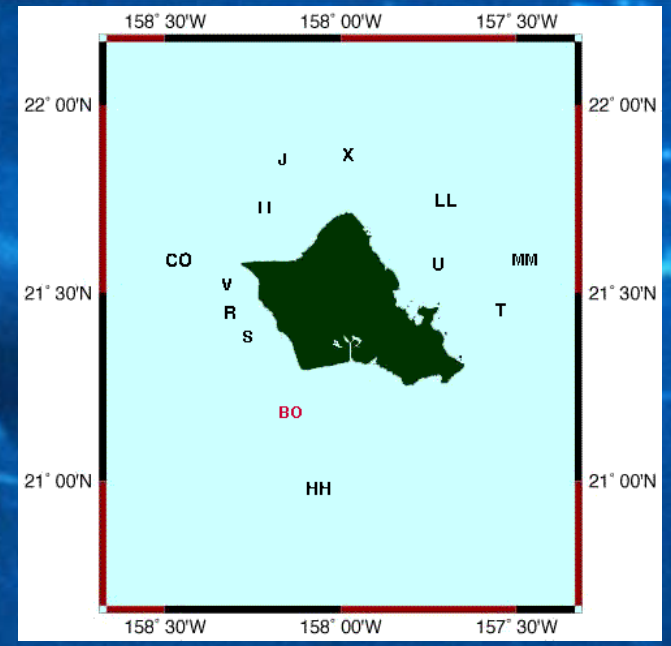
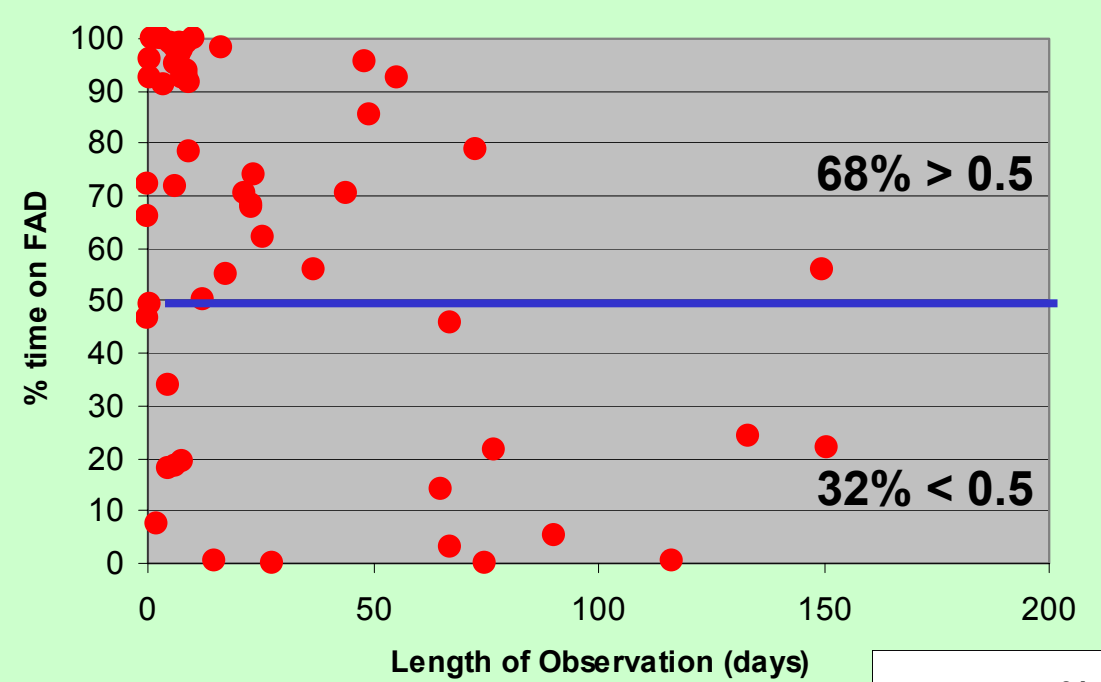


All FADs visited

« Good » FADs
vs.
« Bad » FADs

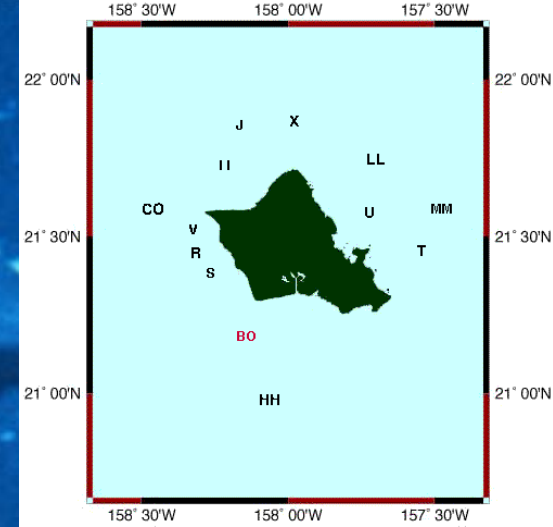
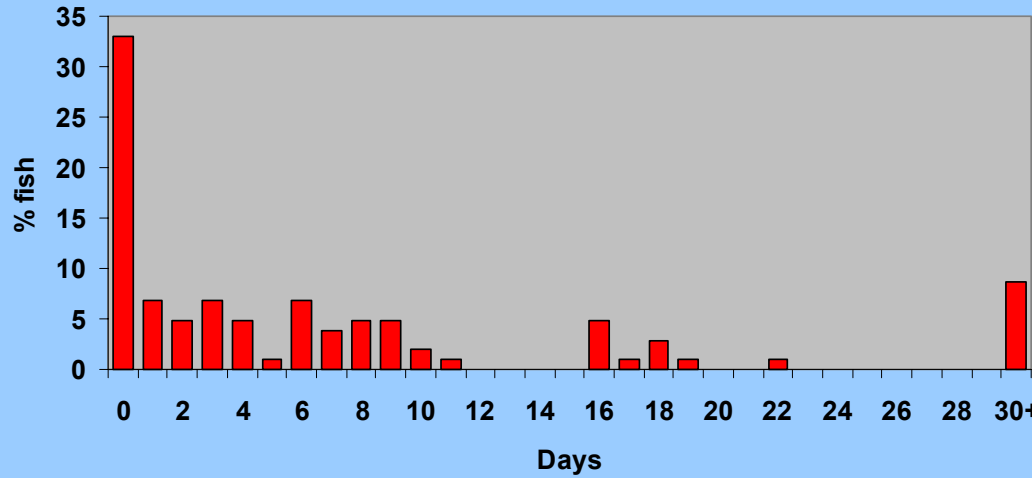
Distribution of % of hits per FAD



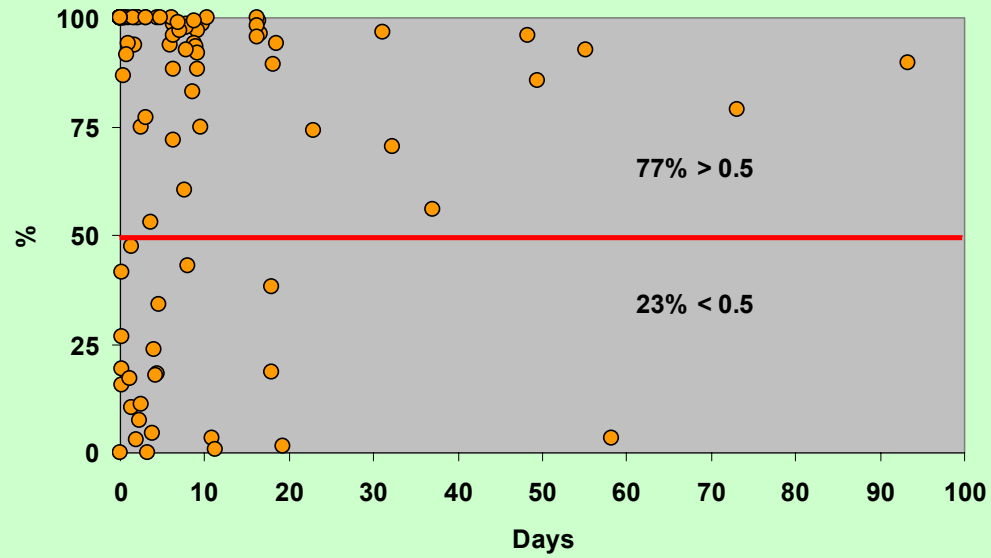


How much time does a fish spend associated to FADs?

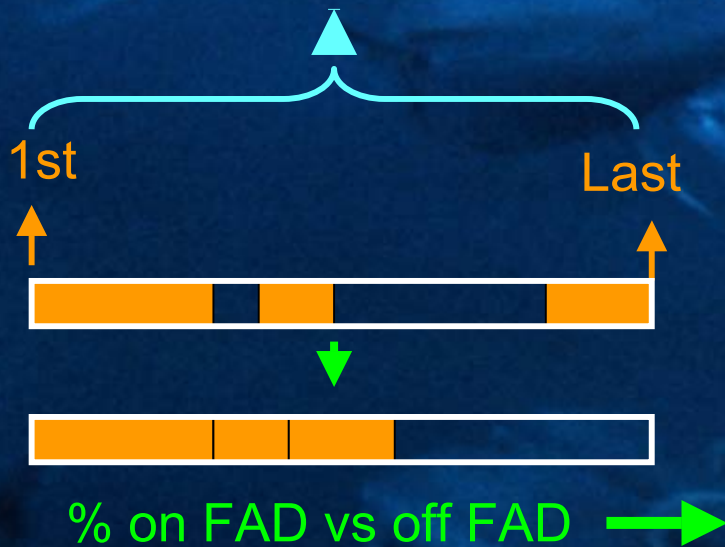
**Time interval on same FAD
(from 1st to last hit)**



**% of time spent "on a FAD"
(≤ 1 hour gap)**

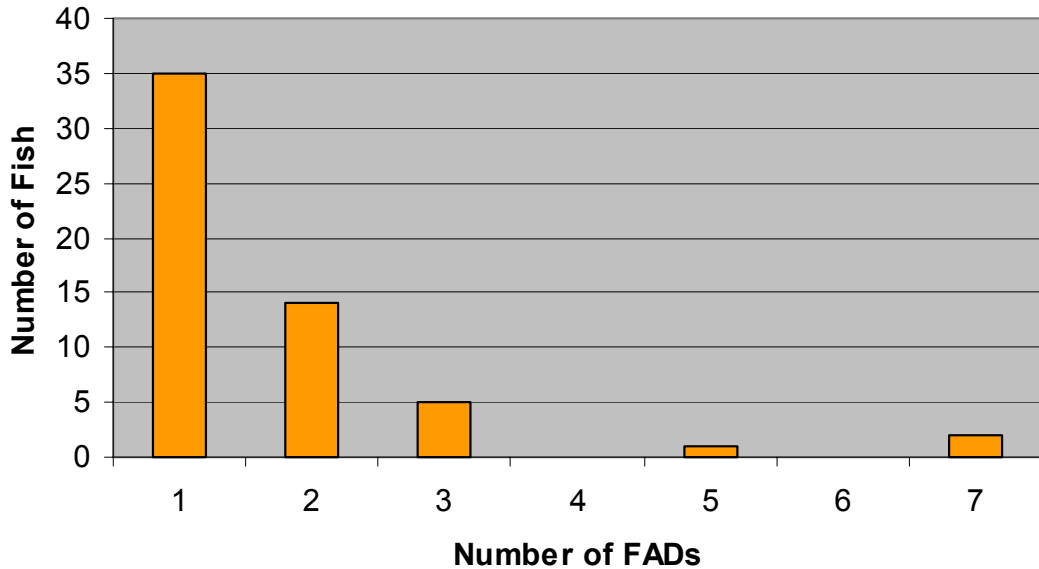


Time around a FAD

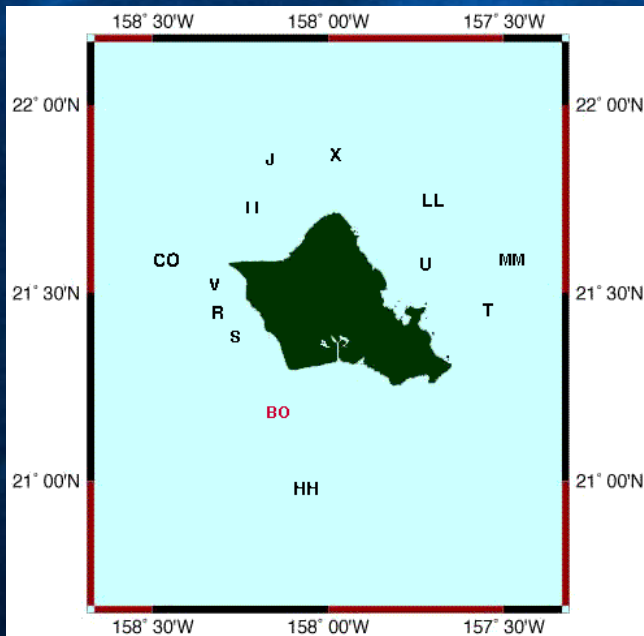


How much time does a fish spend around a FAD?

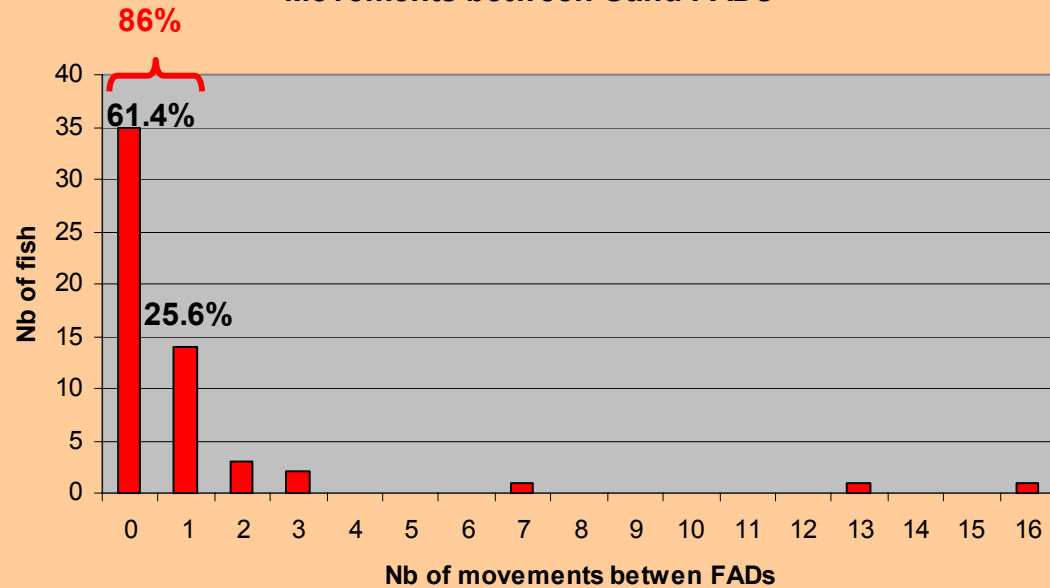
Number of FADs visited by fish (YFT & BET)



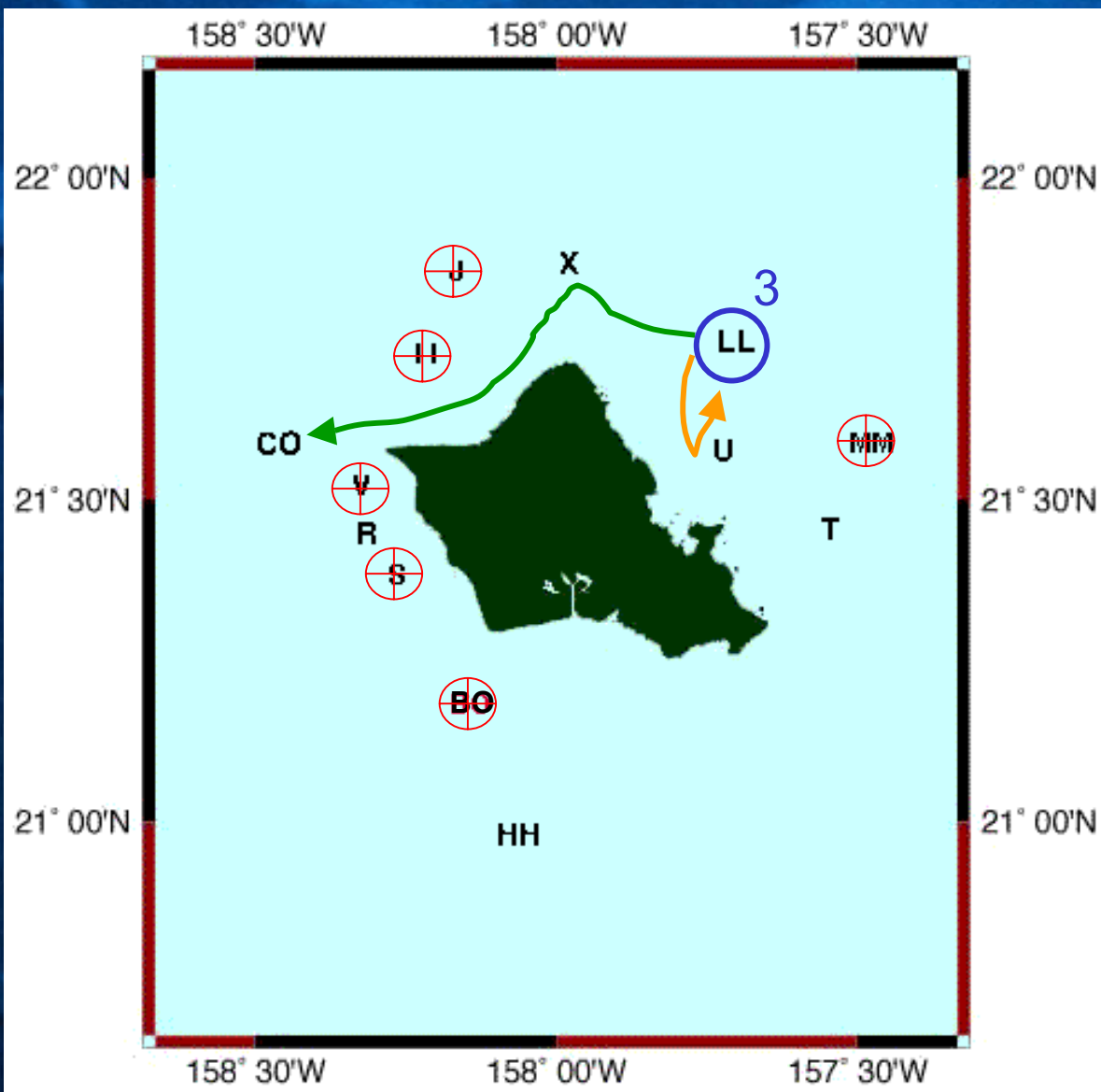
Movements:
Do fish visit many FADs while around Oahu?



Movements between Oahu FADs



5 BET & 1 YFT tagged at LL FAD Nov 03



3 BET: LL (Nov)
1h30, 5 d (cont.)
& 9 d (7 cont.)

1 BET: LL-U-LL (Nov)
9 d at LL (almost cont.)
9' at U – 6 h travel
16' at LL – 5 h travel

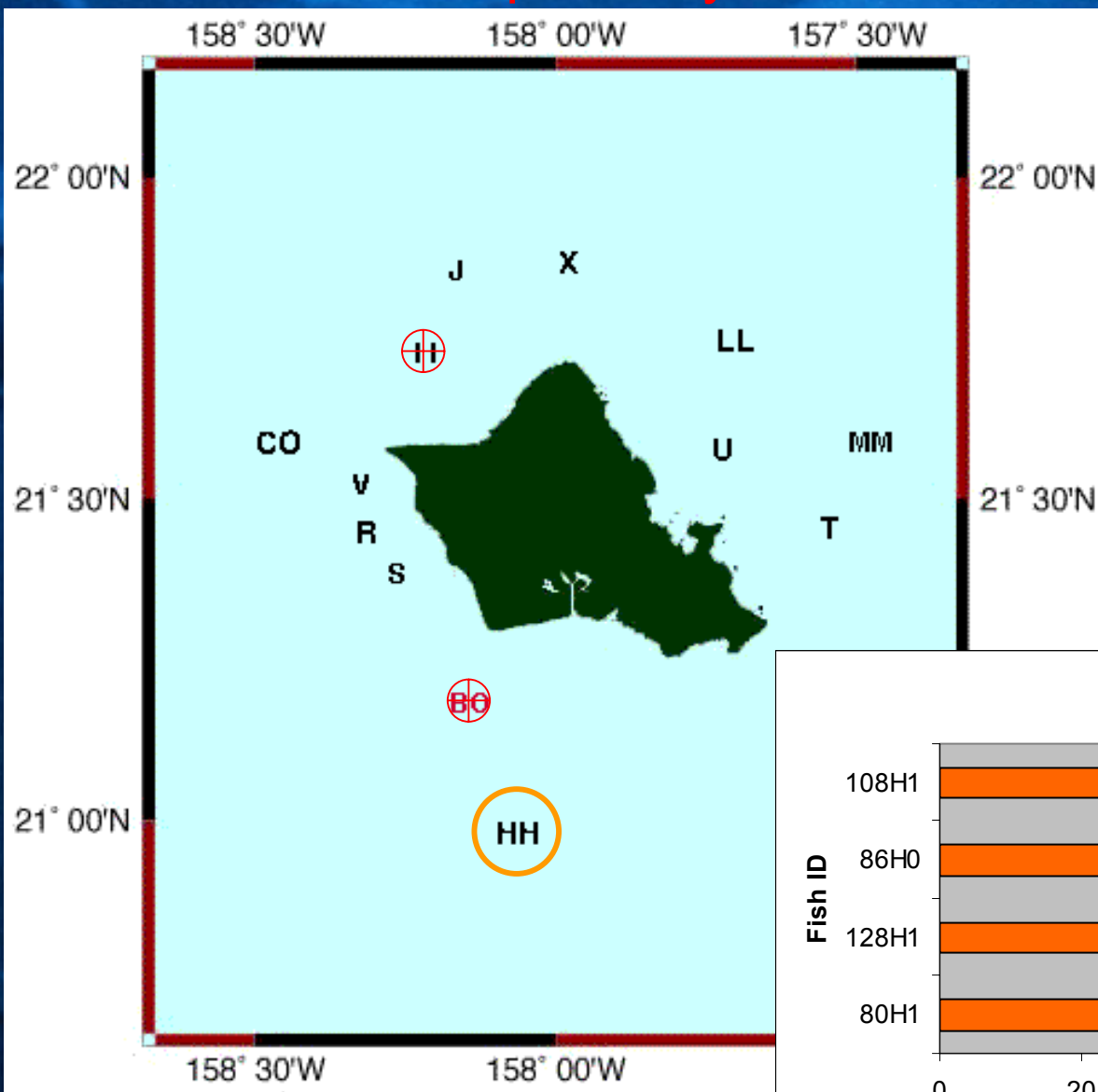
1 YFT: LL-X-CO (Jan)
2 m absence
3 d at LL
3' at X – 1.5 d travel
2 short stays at CO (<3 h)
3 d travel

1 BET not detected
(with Archiv)

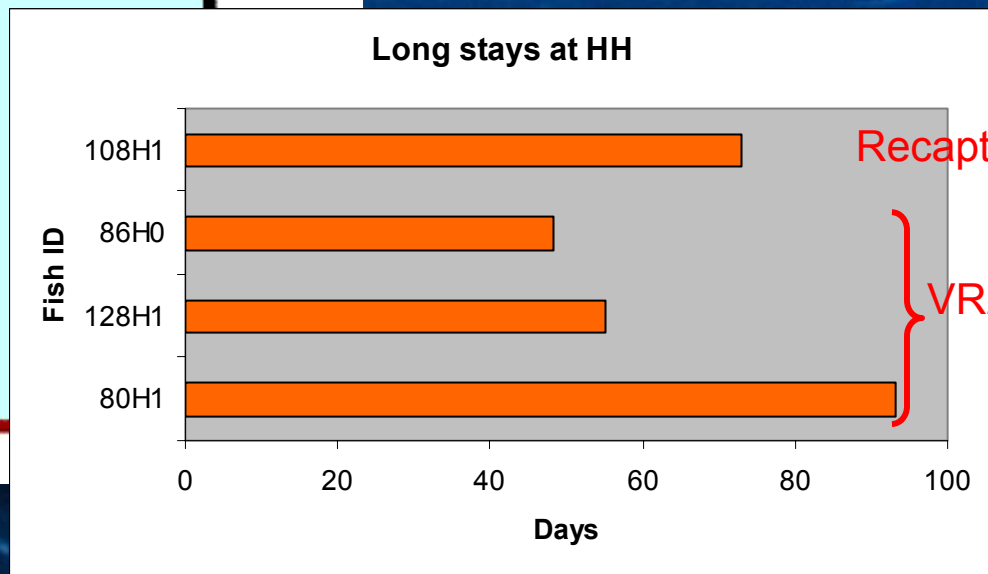
2 hits

No recapture

1 BET & 9 YFT tagged at HH FAD March, April, May 03



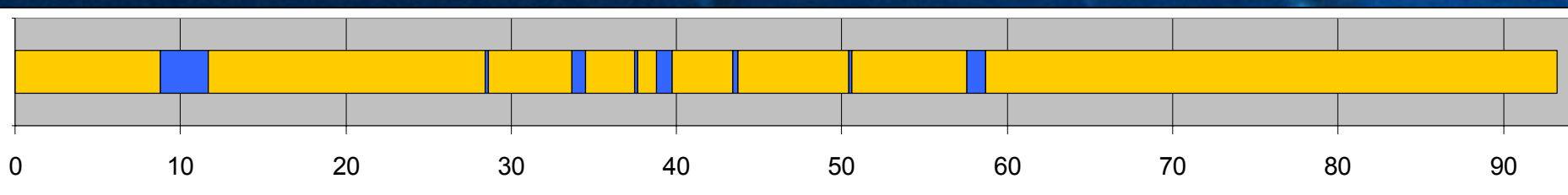
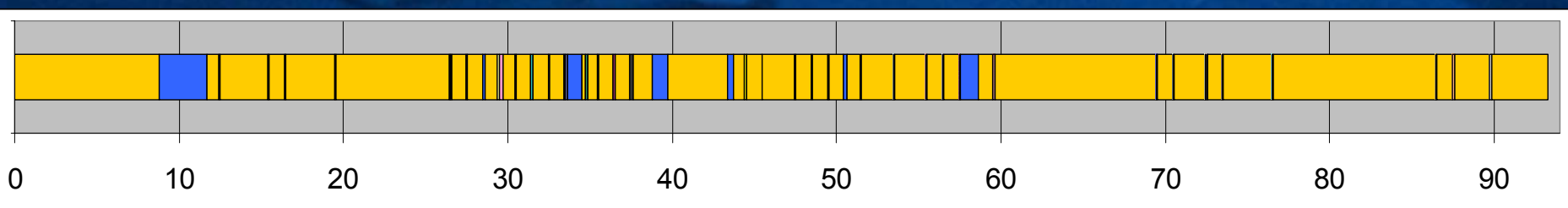
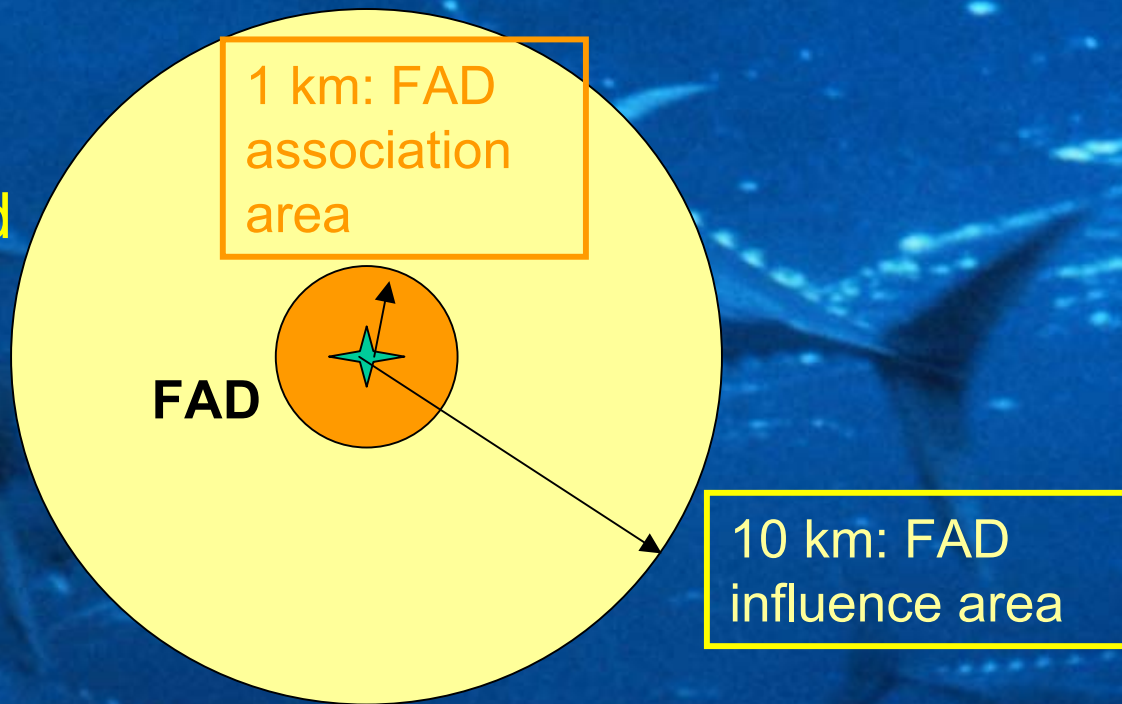
All 10 fish stayed at HH
4 rec. at HH



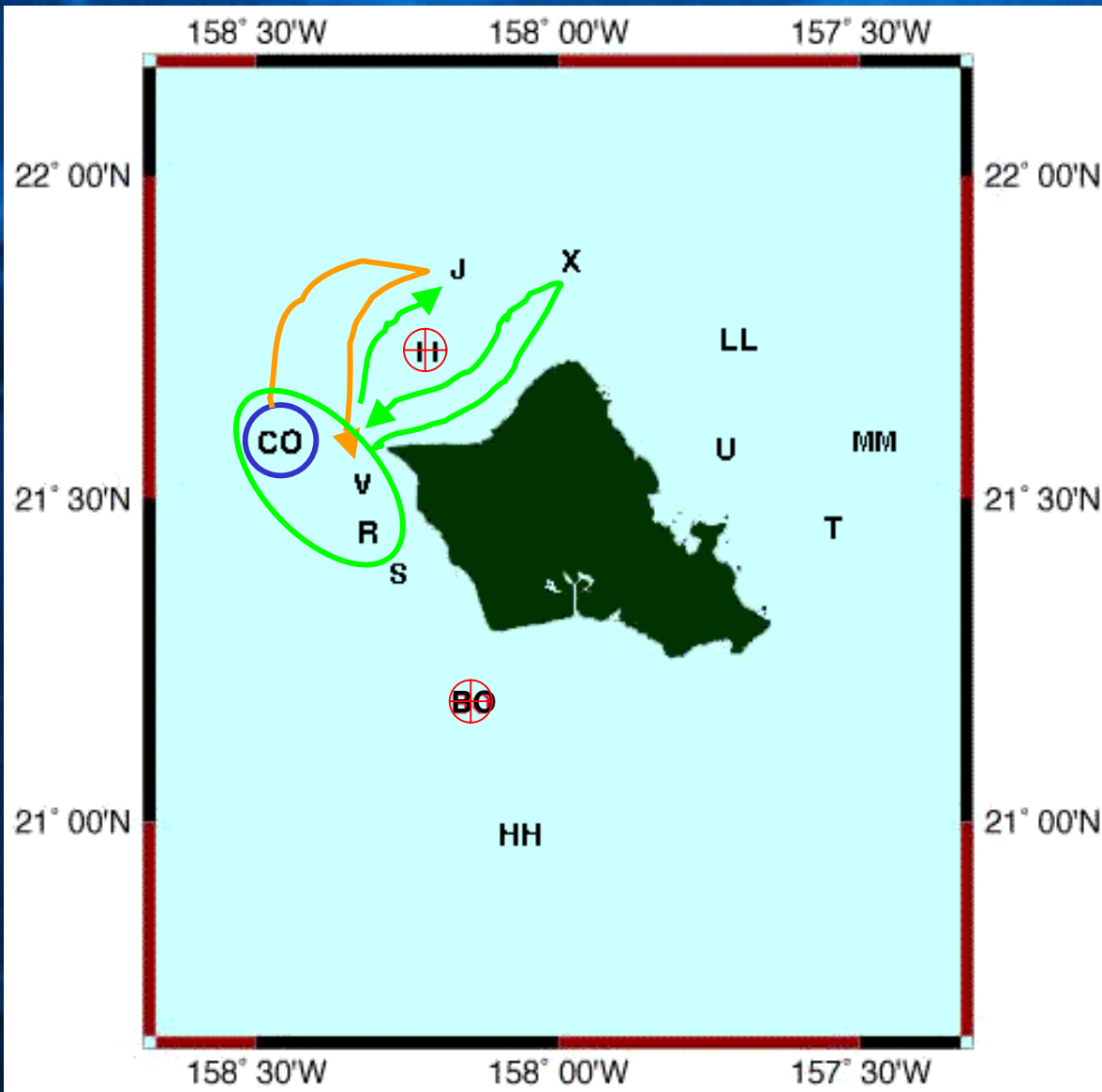
Fish 80H1

93.3 days

90% time associated
to HH FAD



6 BET & 21 YFT tagged at CO FAD Feb 03



21: CO (Feb)

20' to 16 d

5 YFT & 1 BET recaptured.
All at CO, 1 at HH

1 YFT: CO-J-V (March-Apr)

1 d at CO (11 d travel)

1 m at J (9 h travel)

8' at V (77% on FAD)

1 YFT: CO-V-R-CO-V-CO-
V-R-V-X-V-CO-V-J (83H0)

2 d at CO, then short
stays

4 d at X

1 m at J, recaptured at J
(6 May)

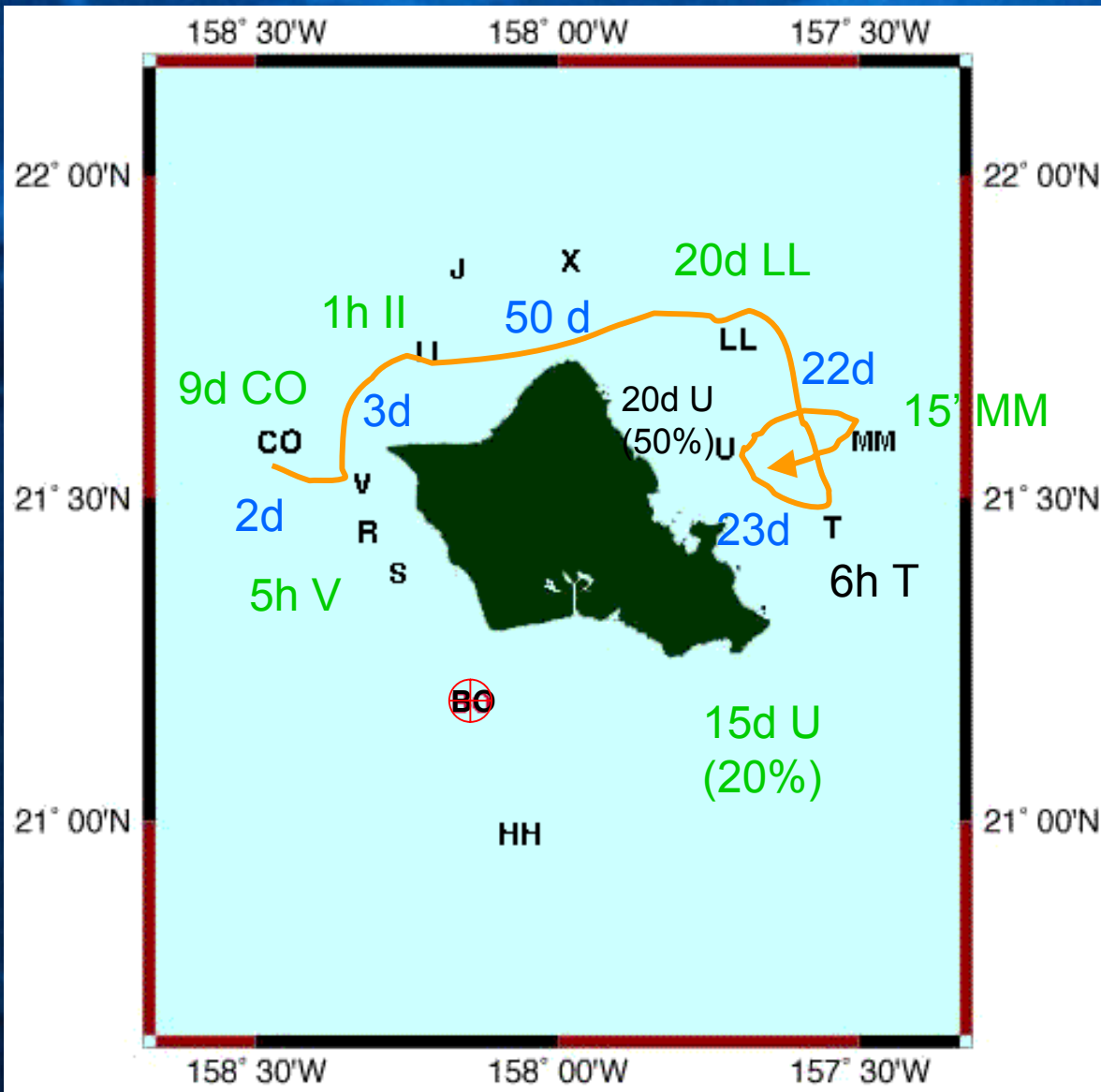
(46% on FAD)

2 YFT not detected

(1 with Archiv)

0 ping (tags OK?)

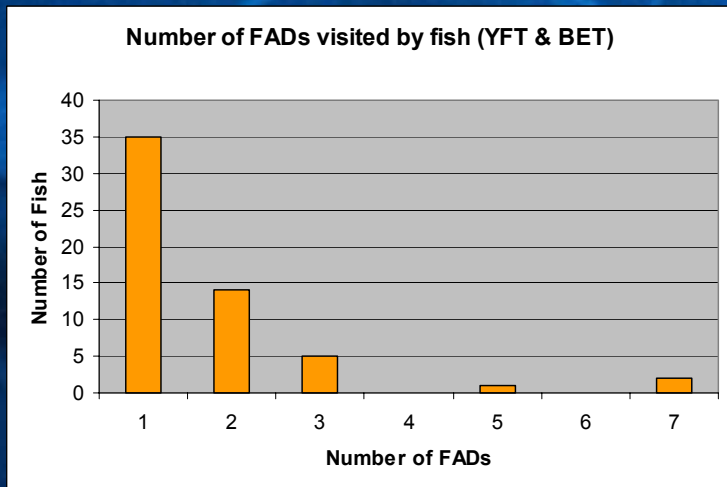
6 BET & 21 YFT tagged at CO FAD Feb 03



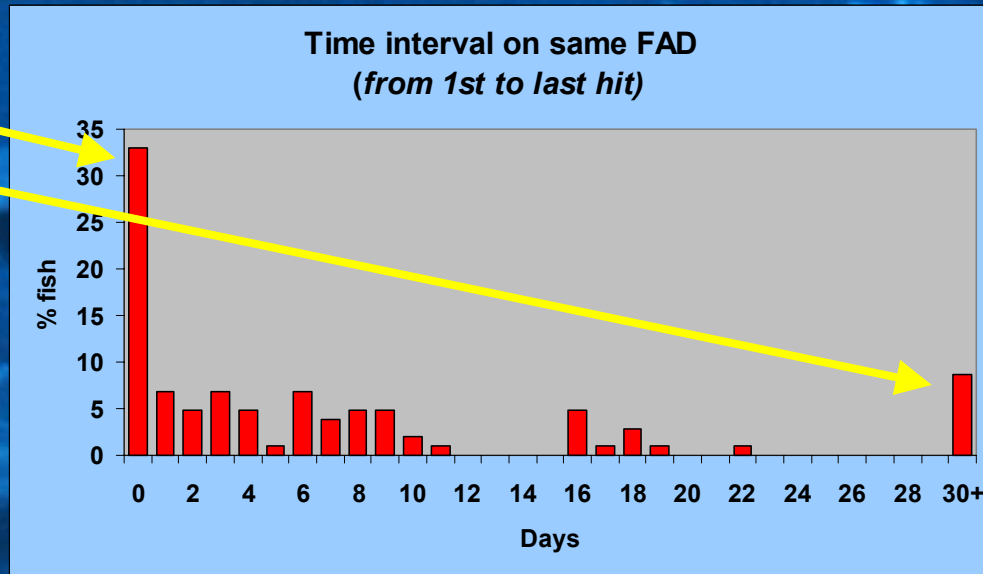
1 YFT: CO-V-II-LL-T-U-
MM-U (75H0)

22% on FAD

Very short associations
Very long associations

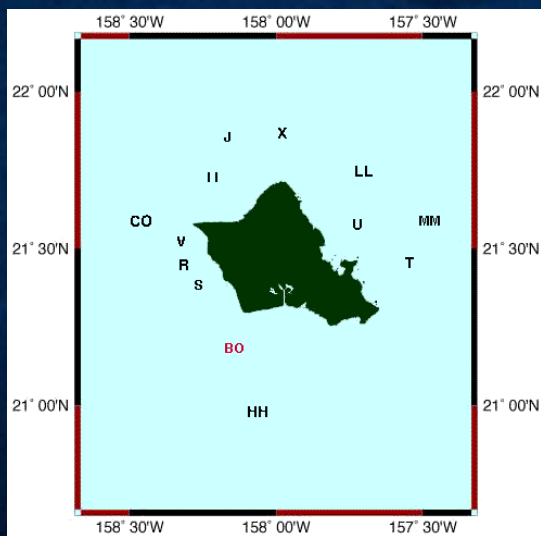


Most fish were detected at only 1 or 2 FADs



Future:

- More Tagging (schools & smaller individuals & depth behavior)
- Bigger network (other islands?)
- Individuals vs. Biomass
- Role of local conditions & neighboring FADs?



New projects (PFRP + EU)